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<p>(21) International Application Number: <b>PCT/DK89/00287</b> (22) International Filing Date: <b>4 December 1989 (04.12.89)</b> (30) Priority data: <b>6766/88 5 December 1988 (05.12.88) DK</b> (71)(72) Applicant and Inventor: <b>ANDREASEN, Ib, Rægaard [DK/DK]; Vestervigvej 15, DK-2720 Vanløse (DK).</b> (74) Agent: <b>DANSK PATENT KONTOR A/S; H.C. Ørsteds Vej 70, DK-1879 Frederiksberg C (DK).</b> (81) Designated States: <b>AT, AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CF (OAPI patent), CG (OAPI patent), CH, CM (OAPI patent), DE, DK, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, HU, IT (European patent), JP, KP, KR, LK, LU, MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NO, RO, SD, SE, SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.</b></p>		<p><b>Published</b> <i>With international search report.</i></p>
<p>(54) Title: <b>ILLUMINATED UMBRELLA OR PARASOL</b></p> <p>(57) Abstract</p> <p>An illuminated umbrella or parasol (1) is described, in which there are two coaxial light conductors (not shown) within the umbrella stick (2). The inner light conductor supplies light to the central region of the cover (3), to a number of further light conductors in the ribs (4) terminated by light-spreading rib caps (11), and to a light-spreading top spike (12), while the outer light conductor supplies light to the peripheral region of the cover (3). Emphasis on the illumination may be switched between the two coaxial light conductors by means of optical means (not shown) in the handle (7), controlled by a manually slideable button (36), said handle (7) also containing the requisite batteries, a light light bulb and a lens and/or a reflector (not shown), the switching e.g. being achieved by altering the position of the bulb.</p> <div data-bbox="795 1155 1494 1953"> </div>		

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ILLUMINATED UMBRELLA OR PARASOLTECHNICAL FIELD

The present invention relates to an umbrella or a  
5 parasol of the kind set forth in the preamble of claim  
1.

BACKGROUND ART

In previously known umbrellas or parasols of this  
kind, the inside of the cover has been illuminated by  
10 means of a single light-spreading device, the latter  
being supplied with light through a light conductor  
leading from the source of light, usually a battery-  
powered electric bulb situated in or near the handle  
of the umbrella or parasol. The use of a single light-  
15 spreading device has, however, proved insufficient to  
provide a reasonably uniform illumination of the whole  
of the inside of the cover.

DISCLOSURE OF THE INVENTION

It is the object of the present invention to provide  
20 an umbrella or a parasol of the kind referred to  
above, in which it is possible to obtain a more  
uniform illumination of the inside of the cover than  
previously possible, and this object is achieved with  
an umbrella or a parasol, according to the present  
25 invention further exhibiting the features set forth in  
the characterizing clause of the claim 1. With this  
arrangement, the inside of the cover is illuminated by  
two mutually independent light-spreading devices,  
making it substantially easier to provide a uniform  
30 illumination of the inside of the cover.

Advantageous embodiments of the umbrella or parasol according to the present invention, the effects of which are explained in the following detailed portion  
5 of the present specification, are set forth in claims 2-10.

#### BRIEF DESCRIPTION OF THE DRAWINGS

In the following detailed specification the present invention is explained with reference to the drawings  
10 in which

- Figure 1 is an overall view of an exemplary embodiment of an illuminated umbrella according to the present invention, shown in elevation and partly in section,
- 15 Figure 2 is a vertical sectional view showing the transition region between the outer light conductor and the associated reflecting surfaces,
- Figure 3 shows the reflecting surfaces shown in  
20 Figure 2 as viewed from below,
- Figure 4 is a vertical sectional view showing the transition region between the inner light conductor, the reflecting surfaces associated therewith and further means supplied with  
25 light from these reflecting surfaces, and
- Figures 5 and 6 are diagrammatic vertical sectional views showing the lower ends of the light conductors and the light source with the  
30 latters electric light bulb into different positions.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

The umbrella 1 shown in Figure 1 comprises in the usual manner an umbrella stick 2 and a cover 3, the

latter being held in the open position shown by a number of ribs 4 supported by struts 5 on a slide 6, with which the cover 3 may be collapsed in the usual manner by moving the slide 6 towards the handle 7.

In the exemplary embodiment of an umbrella according to the present invention shown in Figure 1, the handle 7 comprises a battery (not shown), an electric light bulb 8, a reflector 9 and a lens 10, the latter three items being shown in Figures 5 and 6.

The exemplary embodiment shown in Figure 1 also comprises various optical means to be described below, with which

- light may be projected onto the inside of the cover 3 in the central and peripheral regions thereof,
- light may be conducted through the ribs 4 to a number of light-spreading rib caps 11, and
- light may be conducted to a light-spreading top spike 12.

As may be seen especially from Figures 2, 5 and 6, the umbrella according to the present invention comprises an inner light conductor 13, and coaxial therewith an outer light conductor 14.

The output end 15 of the outer light conductor 14 is adapted to emit light towards a number of concave reflecting surfaces 16 adapted to reflect the light from said output end 15 towards the non-central regions of the umbrella cover 3. In order to make the angle 17, through which the light is distributed in the vertical direction (i.e. parallel to the stick 2), smaller than the angle 18, through which the light is

distributed in the peripheral direction, so as to ensure a reasonably uniform illumination of the cover 3 with a minimum of light lost below its edge, the  
5 concave reflecting surfaces are shaped with a dual curvature, making them "astigmatic". By comparing Figures 2 and 3, it will be seen that this astigmatism produces two focal points, i.e. a "vertical" focal point 19 and a "horizontal" focal point 20, the latter  
10 being markedly closer to the common optical axis 21 than the former.

While the outer light conductor 14 terminates with its output end 15 roughly at the same level as the top of the slide 6 in its top position shown in Figure 1, the  
15 inner light conductor 13 continues upwards to a point considerably closer to the top of the cover 3, where it is terminated by an output end 22, the latter in the exemplary embodiment shown being composed of a central plane portion 23 and a peripheral  
20 frusto-conical portion 24 (please note, that the scale of Figure 4 is twice that of Figures 2 and 3, the scale of the two latter again being twice that of Figures 5 and 6). The light emanating from the peripheral surface 24 is reflected by a number of  
25 concave reflecting surfaces 25, thus being spread outwardly and upwardly and distributed through a "vertical" angle 26 to illuminate the central region of the cover 3 shown in Figure 1.

At this point it should be noted that the hollow  
30 member 27, on which the concave reflecting surface 25 are formed, is shown in Figure 4 with its upper and lower portions lying above and below a horizontal plane 28 respectively mutually rotated through a small angle about the optical axis 21 for reasons which will

appear below.

The concave reflecting surfaces 25 are formed on a number of "teeth" 29, the interstices between adjacent  
5 teeth 29 permitting some of the light from the output end 22 to reach a further set of concave reflecting surfaces 30 formed on the upper end of said hollow member 27 and adapted to reflect this light into the input ends 31 of a number of light conductors 32, the  
10 output ends 33 of which are surrounded by end caps 11 of transparent or translucent material capable of spreading the light received from the output ends 33. The light conductors 32 are preferably adapted to extend alongside or inside the umbrella ribs 4 shown  
15 in Figure 1, the end caps 11 in the latter case also constituting the rib caps adapted in the usual manner (not shown) to fasten the cover 3 to the individual ribs 4.

The concave reflecting surfaces 25 and/or 30 shown in  
20 Figure 4 may have a dual curvature (be "astigmatic") in the same manner as described above with reference to the concave reflecting surfaces 16 shown in Figure 2 and 3.

As shown in Figure 4, light from the central plane  
25 portion 23 of the output end 22 on the inner light conductor 13 may flow through the central cavity 35 in the hollow member 27 to the lower end of the top spike 12, the latter being made of transparent or translucent material and suitably adapted to radiate  
30 the light thus received from the inner light conductor 13.

In Figure 4, both the top spike 12 and the end caps 11 are shown as consisting of translucent material, which

is known to distribute light received in a diffuse manner. It should, however, be noted that these bodies may consist of transparent material with matt surfaces, this giving approximately the same effect. For the sake of good order, it should also be mentioned that the term "light conductor" is used herein to denote a body of transparent material with an input end and an output end and with such a shape between these ends, that substantially total internal reflection occurs at the external surfaces between said ends.

Figures 5 and 6 show how the light from the electric light bulb 8 may be directed mainly towards the outer light conductor 14 (Figure 5) or towards the inner light conductor 15 (Figure 6). The change is effected by axially moving the light bulb 8 from the position shown in Figure 5 to the position shown in Figure 6, the light bulb 8 preferably being mechanically connected in a manner not shown to a focus button 36 on the handle 7 shown in Figure 1. Thus by shifting the light bulb 8 from the position shown in Figure 5 to the one shown in Figure 6 it is possible to change the emphasis of the illumination from the non-central region of the cover 3 to the central region of this cover together with the rib caps 11 and the top spike 12. Instead of the single movable light bulb 8 shown in Figures 5 and 6, it is also possible to use two separate light bulbs adapted to be activated alternately or simultaneously.

Figures 2-6 make no pretence of showing geometrically exactly the shapes of the various optically active surfaces, such as those on the concave reflecting surfaces 16, 24 and 30, the input and output ends of



the various light conductors, and the surfaces of the reflector 9 and the lens 10. A person with basic knowledge in optics will, however, be able to choose  
5 the correct shape of the surfaces in question and/or the material to be used.

Apart from the stick 2, the cover 3, the ribs 4, the struts 5 and the slide 6, the drawing does not show the mechanical parts of the umbrella 1 according to  
10 the present invention. On the basis of the present specification a skilled person will, however, be able to design and construct these mechanical parts in a suitable manner to enable them to fulfil their functions, but it may be mentioned that a metal tube  
15 37 in the space between the inner and outer light conductors 13 and 14 respectively may be used to make the umbrella stick 2 sufficiently rigid. When assembling the umbrella care should be taken to orient the concave reflecting surfaces 16 shown in Figures 2  
20 and 3 in such a manner relative to the axis 21 that the light reflected from these surfaces is not obstructed by the struts 5.

The handle 7 may comprise a translucent or transparent zone 38 that allows some of the light from the bulb 8  
25 to radiate through this zone.

If desired, the rib caps 11, the top spike 12 and/or the zone 38 on the handle 7 may comprise fluorescent material, such as of the kind continuing to radiate light for some time when it is no longer being  
30 irradiated itself.

Instead of the top spike 12 it is possible to use a member comprising reflecting surfaces adapted to

reflect light received through the central cavity 35  
in a downward direction so as to illuminate the upper  
side of the cover 3. A combination of the two could  
5 also be used.

## C L A I M S.

1. An umbrella (1) or parasol of the kind comprising:
- 5 a) a light source (8,9,10) placed close to or in the handle (7) of the umbrella or parasol,
- b) at least one elongated light conductor (13,14) extending from said light source in the direction towards the cover (3) of the umbrella or parasol,
- 10 and
- c) at least one light-spreading device (16,25,30) adapted to guide the light transmitted from said light source by said light conductor or conductors (13,14) away from the latter,
- 15 characterized by
- d) at least two light conductors (13,14), of which
- d1) a first light conductor (13) extends to within a short distance below the cover (3) and is terminated by first light emitter (25) situated
- 20 close to and below said cover (3) and adapted to direct light towards the central region of the inside of said cover,
- d2) a second light conductor (14) is terminated at a greater distance below the cover by a second light
- 25 emitter (16) adapted to direct light towards regions outside said central region of the inside of said cover.
2. An umbrella or parasol according to claim 1, characterized in
- 30 a) that the two light conductors (13,14) are coaxial with each other with the first (13) within the second (14), and
- b) that at least one of the light conductors (13,14) is adapted to direct light generally axially from

its output end towards a set of reflectors (16,25,30) adapted to reflect the light generally radially outwards.

5 3. An umbrella or parasol according to claim 1 or 2, characterized by a third light emitter (30) situated between the cover (3) and said first light emitter (25) and adapted to direct light towards the inwardly facing input ends (31) of a set of third  
10 light conductors (32), the outwardly facing output ends (33) of which are situated close to the outer free edge of the cover (3) and are optically connected to light- spreading means (11).

4. An umbrella or parasol according to claims 2  
15 and 3, characterized in that the set of reflectors (25,30) associated with the output end of the first light conductor (13) consists of two sub-sets, viz.

a) a lower sub-set (25) in which the reflectors are angularly spaced about the optical axis (21) of  
20 the first light conductor (13) with light-permeable interstices (between teeth 29) between them, and

b) an upper sub-set (30), in which the reflectors are angularly spaced about said optical axis (21) and  
25 situated in positions to receive light reaching them from the output end (22) of the first light conductor (13) through said light-permeable interstices.

5. An umbrella or parasol according to any one  
30 or any of the claims 2-4, characterized in that each set of reflectors (16,25,20) comprises a number of concave reflecting surfaces.

6. An umbrella or parasol according to claim 5, characterized in that at least some of said concave reflecting surfaces (16,25,30) have such a focal width, that roughly parallel rays from the output ends of the associated light conductors (14,13) are made to cross each other at points lying a short distance from the reflecting surfaces.

7. An umbrella or parasol according to claim 6, characterized in that at least some of said concave reflecting surfaces have a dual curvature (are astigmatic) in such a manner, that said points of crossing appear closer to said optical axis (21) when viewed in a direction parallel to said axis (e.g. Figure 3) than when viewed at right angles to it (e.g. Figure 4).

8. An umbrella or parasol according to any one or any of the claims 2-7, characterized by a top light-spreading means (12) extending above the cover (3), said top means being adapted to receive light from the output end of said first light conductor (13), e.g. through a central hole (35) in a member (27) carrying the reflecting surfaces (25,30) associated with the first light conductor (13).

9. An umbrella or parasol according to any one or any of the claims 1-7, characterized in that the light source or the connecting member connecting the light source to the input ends of the light conductors (13,14) at least partially (38) consists of transparent or translucent material in such a manner, that light from the light source may emanate from its external surface.

10. An umbrella or parasol according to any one or any of the claims 1-9, characterized in that the light source depending on the position of a manual  
5 control member (36) is adapted to direct its light output to the input ends of either of the light conductors (13,14) or both.

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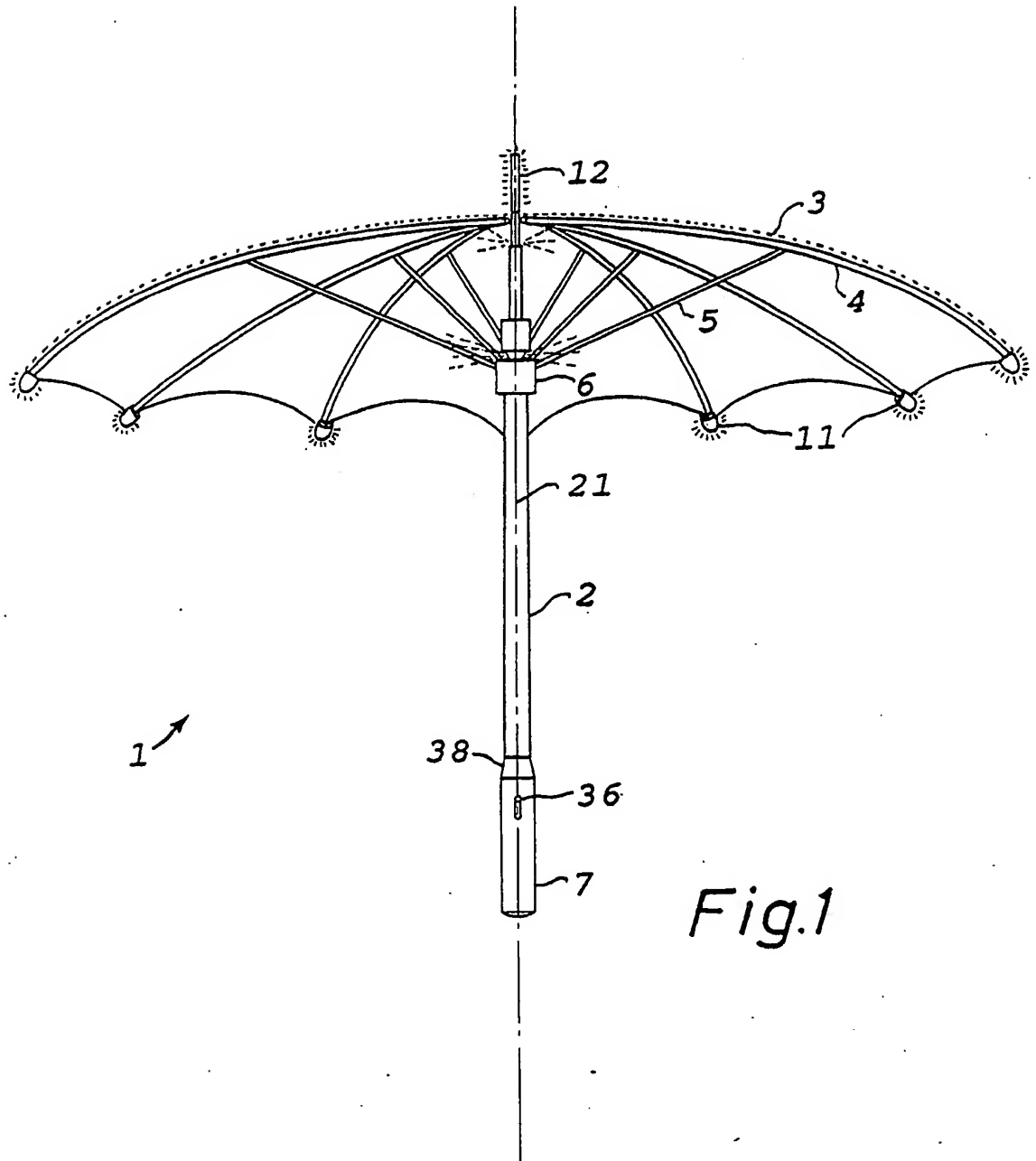


Fig.1

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Fig.3

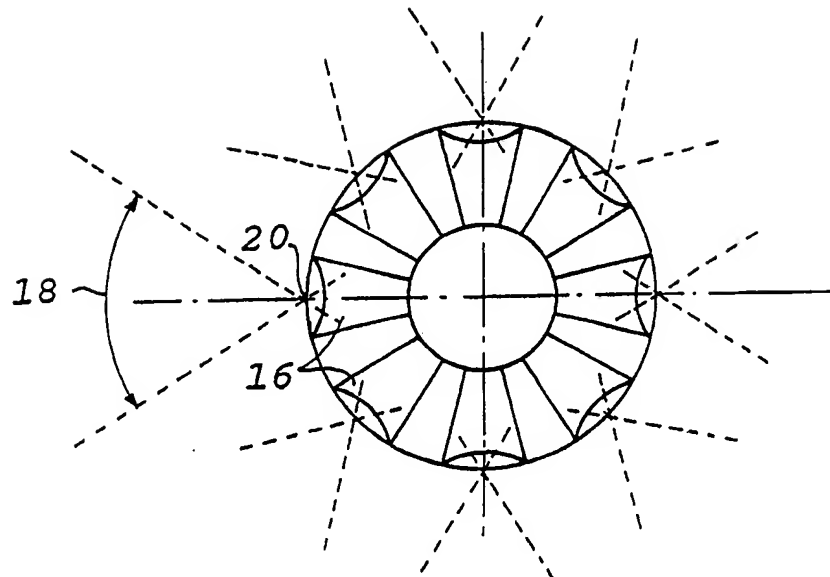
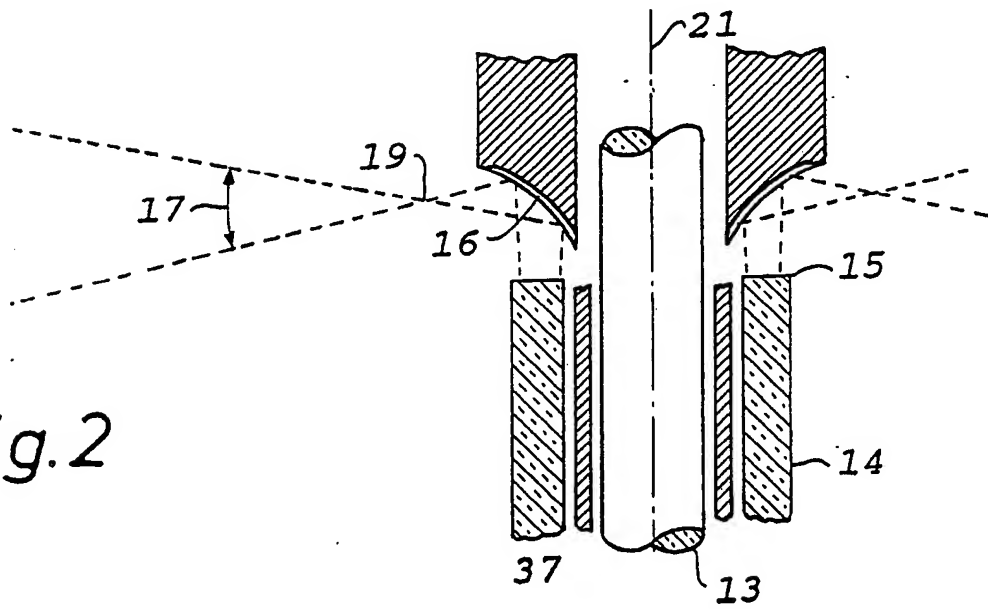


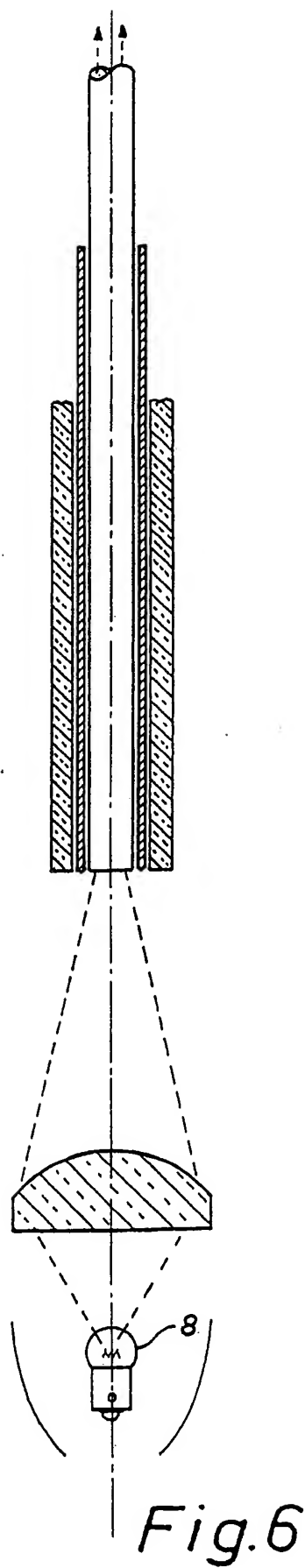
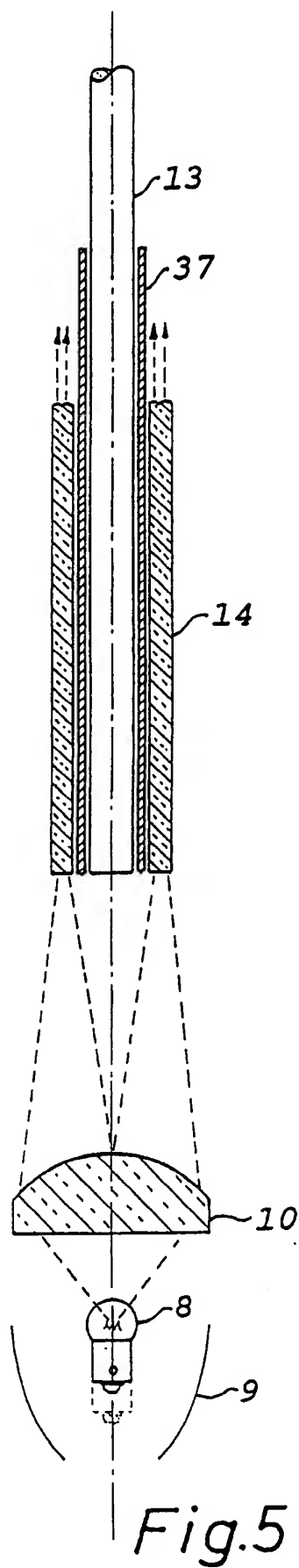
Fig.2







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# INTERNATIONAL SEARCH REPORT

International Application No **PCT/DK 89/00287**

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
<b>IPC5: A 45 B 3/04</b>		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched *		
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<b>IPC5</b>	<b>A 45 B</b>	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched *		
<b>SE,DK,FI,NO classes as above</b>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT *</b>		
Category *	Citation of Document, ** with indication, where appropriate, of the relevant passages **	Relevant to Claim No. **
A	US, A, 3275815 (A-M. GOLAZ NÉE PETROFF ET AL) 27 September 1966, see column 2, line 69 - column 3, line 35; figures 6,7 --	1
A	US, A, 4099535 (HUBACHEK) 11 July 1978, see column 5, line 55 - column 6; figures 8-10 --	1
A	FR, A3, 2477388 (LISOTTI SILVANA) 11 September 1981, see page 1, line 28 - page 2, line 17; figures 1-2 --	
A	FR, A2, 2628950 (B.V.U. PENNELLA) 29 September 1989, see page 3 - page 6; figures 1-5 --	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents: 10</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p> </div> </div>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
<b>2nd March 1990</b>	<i>Kjell Lundahl</i> <b>1990-03-14</b>	
International Searching Authority	Signature of Authorized Officer	
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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
E	US, A, 4848385 (PENNELLA) 18 July 1989, see column 2 - column 4 -- -----	

**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO. PCT/DK 89/00287**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 3275815	27/09/66	NONE	
US-A- 4099535	11/07/78	NONE	
FR-A3- 2477388	11/09/81	NONE	
FR-A2- 2628950	29/09/89	NONE	
US-A- 4848385	18/07/89	NONE	

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